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ABSTRACT

The Agnate Sentences Test was designed to measure awareness of the relationship between sentences that are similar in semantic content but different in syntactic structure. In this study, developmental differences in the ability to decode written syntax are observed by means of this test which was administered to 63 4th graders, 65 8th graders, and 66 11th graders. Data showing the proportion of subjects in each grade who chose each option of the various items are presented in 25 tables. Comments on the syntax of the sentences and possible interpretations of test results are given in short paragraphs following the tables. It is concluded that although the test results do show something about developmental differences in ability to decode written syntax, exactly what they show about decoding ability and what the implications are for analysis or reading comprehension are questions that require further investigation. (TS)

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PERCEPTION OF AGNATE SENTENCE RELATIONSHIPS BY PUPILS IN GRADES FOUR, EIGHT, AND ELEVEN

by

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Various techniques have been utilized in the attempt to measure the level of syntactic development of children at different age levels. Brown and Fraser (1963) asked preschool children to repeat sentences. Loban (1963) showed pictures to children and asked them to discuss what they saw in each picture. Hunt (1964) obtained from teachers the assigned written work of pupils. O'Donnell, Griffin, and Norris (1967) showed cartoon movies to children at six different grade levels and asked them to talk (and then for grades three, five, and seven to write) about what they saw. Carol Chomsky (1969) studied children's comprehension of selected structures by observing their verbal and action responses to questions and directions.

In the present study, developmental differences in the ability to decode written syntax are observed by means of a test of perception of agnate sentence relationships. It is assumed that test items which are difficult for elementary school pupils, less difficult for middle school pupils, and still less difficult for high school pupils will reveal something about developmental differences in syntactic ability. It is recognized that differences in basic reading skills of pupils influence test performance, and for that reason the vocabulary of the test was rigidly controlled. The instrument used in this study is the "Agnate Sentences Test," which was developed by O'Donnell (1974).

The "Agnate Sentences Test" was designed to measure awareness of the relationship between sentences that are similar in semantic content but different in syntactic structure. The term agnate comes from the discussion of relation and process by Gleason (1965, p. 196), who uses the terms enation and agnation to denote two kinds of relations which exist between sentences or other constructions and are basic to the grammatical system of the language.

The relationship of enation is illustrated by the following sentences:

(1) The dog bit the man.

(2) The cat ate the canary.

The same grammatical description would apply to both sentences; what can be said about parts of speech, syntactic relationships, and structure signals for one sentence can be said about the other. Thus, the differences between the two sentences are lexical rather than syntactic.

The relationship of agnation is illustrated by these two sentences:

(1) The dog bit the man.

(3) The man was bitten by the dog.

According to Gleason, the relationship which a native speaker senses between these two sentences can be accounted for neither by similarity in meaning nor similarity in vocabulary alone. He says: "It has a grammatical relation, that is, a relation between two grammatical structures. Derivative from it is a grammatical process, a manipulation which works on the grammatical structure and converts one member of the pair into the other. . . . This process is called a transformation" (p. 198).

In terms of transformational-generative grammar, it can be said that agnate sentences are sentences that have essentially the same deep structure but different at surface structure.

The "Agnate Sentences Test" is made up of twenty-five items of the three-option multiple-response type. The stem of each item is a "pattern" sentence, which is to be matched with one of three options. In the following example, the correct option is indicated by an asterisk:

The boy brought a bone to the dog.

*a. The boy brought the dog a bone.

b. A bone was brought to the boy by the dog.

c. The dog brought the boy a bone.

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The content of the test is described as follows in O'Donnell (1974, p.4):

> Pattern sentences and correct responses in the various items involve a variety of syntactic structures and alternatives, including options among infinitive, gerund and noun clause constructions; options among relative clause, adjective, participle, and appositive constructions; deletion or retention of optional elements; initial or final order of elements; and active or passive constructions. Some option sentences differ from pattern sentences in respect to one structural feature; others differ in respect to several features.
>
> Using the terminology of transformational grammar employed in several current textbooks, in two items the pattern sentence can be broken down into a matrix sentence and three constituent sentences; in four items it can be broken down into a matrix and two constituents; in eighteen items it can be broken down into a matrix and one constituent; in only one item, does the pattern sentence consist of a single base sentence.

The test was administered to 63 fourth graders at Danielsville Elementary School, 65 eighth graders at North Madison Middle School, and 66 eleventh graders at Madison County High School. All three schools are located in Danielsville, Georgia.

The median percentile on the ITBS Reading Test was 20 for grade four, 47 for grade eight, and 42 for grade eleven.

Scores of fourth graders on the "Agnate Sentences Test" ranged from a low of 4 to a high of 21. The mean score was 10.94 with a standard deviation of 3.80. The median score was 11. For the eighth graders, scores ranged from 8 to 24. The mean was 17.17 and the standard deviation 3.66. The median was 17. Eleventh grade scores ranged from 8 to 25, with a mean of 18.36 and a standard deviation of 3.99. The median score for eleventh graders was 19.

The t-ratio for independent means was computed to compare the fourth and eighth grade means. The resulting t-ratio of 9.497 is significant

beyond the .01 level. The t-ratio of 1.783 resulting from comparison of eighth and eleventh grade means is not significant at the .01 level.

Only face validity if claimed for the "Agnate Sentences Test," that is, it appears to measure what it was designed to measure. The claim that it measures some kind of linguistic ability is supported to some extent by its correlation with composite language and reading scores on ITBS. Pearson product moment correlation coefficients were computed for "Agnate Sentences Test" scores and composite language, vocabulary and reading scores for eighth graders. Correlation coefficients of .62, .56, and .65 respectively were obtained for the different measures.

The reliability index (Cronbach-S Alpha stepped down to one element) was .658 for grade four, .727 for grade eight, and .794 for grade eleven. The index projected to a test of 100 items was .885 for grade four, .914 for grade eight, and .939 for grade eleven. Point biserials for dichotomous items ranged from -.13 to .60 for grade four, from .07 to .54 for grade eight, and from .12 to .66 for grade eleven. Item difficulty indices ranged from .095 to .762 for grade four, from .185 to .959 for grade eight, and from .318 to .985 for grade eleven.

Data showing the proportion of subjects in each grade who chose each option of the various items are presented in Tables 1-25. Comments on the syntax of the sentences and possible interpretations of test results are given in the following paragraphs.

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TABLE I

Proportion of Subjects in Each Grade Choosing Each Option for Item

1. The paper was given to John by his friend.
   a. The paper was given his friend by John.
   *b. John's friend gave him the paper.
   c. John has given the paper to his friend.

Option	Grade		
	4	8	11
a.	.13	.00	.03
*b.	.76	.97	.94
c.	.11	.03	.03

Test item 1 requires subjects to recognize the relationship between active and passive constructions. Distractor options reverse the agentive and beneficiary relationships of nouns in the pattern sentence. The item was relatively easy for subjects of all three grade levels, but less easy for fourth grade subjects. The two wrong options were chosen with about equal frequency.

In item 2, subjects were required to recognize the active-passive relationship. In addition, the item includes an infinitive construction. Option c reverses the agentive and patient relationship of the pattern sentence. Option b alters the infinitive construction. The item was easy for eighth and eleventh graders, but about one-third of the fourth graders missed it. Option c was chosen by about twice as many fourth graders as was option b.

*The asterisk indicates the correct option for each item.

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TABLE 2

Proportion of Subjects in Each Grade Choosing Each Option for Item

2. The boy was asked by the man to leave.
   *a. The man asked the boy to leave.
   b. The boy was asked to leave the man.
   c. The boy asked the man to leave.

Option	Grade 4	8	11
*a.	.68	.92	.95
b.	.11	.06	.03
c.	.21	.02	.02

Item 3 requires recognition of the similarity between certain infinitive and gerund constructions. The correct option was chosen by 52 per cent of the fourth graders, 75 per cent of the eighth graders, and 95 per cent of the eleventh graders. Distractor options change the placement of the adjective hard. These two options were about equally attractive.

TABLE 3

Proportion of Subjects in Each Grade Choosing Each Option for Item

3. It was hard for Sam to learn grammar.
   a. It was hard grammar for Sam to learn.
   *b. Learning grammar was hard for Sam.
   c. For Sam it was hard grammar to learn.

Option	Grade 4	8	11
a.	.25	.15	.02
*b.	.52	.75	.95
c.	.22	.09	.03

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TABLE 4

Proportion of Subjects in Each Grade Choosing Each Option for Item

4. The strongest player won the prize.
   a. The player who won the prize was strongest.
   b. The player winning the prize was strongest.
   *c. The prize was won by the player who was strongest.

Option	Grade		
	4	8	11
a.	.25	.23	.35
b.	.16	.02	.09
*c.	.59	.75	.56

Subjects were required not only to recognize the active-passive relationship in item 4, but also the prenominal adjective-relative clause variation. Distractor options reverse the relationship of the matrix and constituent sentences. Option a contains a relative clause, and was much more attractive than option b, which contains a participle phrase. The item was relatively difficult, but least difficult for eighth graders.

Item 5 calls for recognition of the It deletion-extraposition relationship. Option b includes an adverbial clause of time. Option c changes the infinitve phrase. The item was difficult for all three grade levels, particularly for eighth graders. The adverbial clause option was chosen by a majority of subjects at all levels.

In item 6, there are two agnate relationships tested: the active-passive relationship in matrix sentences and the relative clause-appositive relationship in the constituent sentences. Distractor options reverse the matrix and constituent sentences. The item is difficult for all three grades, with only ten percent of the fourth graders selecting the correct option.

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TABLE 5

Proportion of Subjects in Each Grade Choosing Each Option for Item

5. It pleases Bill for Mary to sing.
   *a. For Mary to sing pleases Bill.
   b. Bill is pleased when Mary sings.
   c. Mary sings in order to please Bill.

Option	Grade 4	8	11
*a.	.35	.18	.39
b.	.52	.82	.59
c.	.13	.00	.02

TABLE 6

Proportion of Subjects in Each Grade Choosing Each Option for Item

6. Peter Mason, who is a lawyer, wrote the letter.
   a. Peter Mason, who wrote the letter, is a lawyer.
   *b. The letter was written by Peter Mason, a lawyer.
   c. Peter Mason is a lawyer, who wrote the letter.

Option	Grade 4	8	11
a.	.36	.32	.35
*b.	.10	.35	.35
c.	.52	.32	.30

Item 7 tests for recognition of the adverbial clause-abridged adverbial relationship. Distractor options reverse the main and adverbial clauses.

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Forty percent of the fourth graders chose the correct option, and about twice that many eighth graders chose it. Eighty-eight percent of the eleventh graders made the desired response.

TABLE 7

Proportion of Subjects in Each Grade Choosing Each Option for Item

7. Larry sang a song while he was taking a shower.
   a. Larry took a shower while he was singing a song.
   b. While Larry was singing a song, he took a shower.
   *c. While taking a shower, Larry sang a song.

Option	Grade		
	4	8	11
a.	.32	.08	.00
b.	.29	.09	.12
*c.	.40	.83	.88

In some types of sentences the negative particle may be placed either in the matrix or in the constituent sentence, with no essential difference in meaning. Item 8 is based on this variation of negative placement. Option sentences include negation in both the matrix and the constitutent sentences. The item was moderately easy for all three grades, but least easy for fourth graders.

Item 9 calls for recognition of the adverbial clause-nominative absolute relationship. Distractor options shift the function of the noun game from direct object of finished to direct object of stopped. The item was moderately easy for eighth and eleventh graders but only one-third of the fourth graders made the right choice.

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TABLE 8

Proportion of Subjects in Each Grade Choosing Each Option for Item

8. Bill thinks Jack won't finish his boat on time.
   a. Bill doesn't think that Jack won't finish his boat on time.
   *b. Bill doesn't think Jack will finish his boat on time.
   c. It isn't thought by Bill that Jack's boat won't be finished on time.

Option	Grade		
	4	8	11
a.	.22	.12	.06
*b.	.60	.86	.88
c.	.17	.02	.06

TABLE 9

Proportion of Subjects in Each Grade Choosing Each Option for Item

9. We finished our game after the rain had stopped.
   a. After the rain had stopped our game, we finished.
   b. We finished after the rain had stopped our game.
   *c. The rain having stopped, we finished our game.

Option	Grade		
	4	8	11
a.	.40	.06	.03
b.	.25	.09	.17
*c.	.33	.85	.80

In item 10 the relationship tested is active-passive, and the sentence includes a gerund construction. Distractor options reverse the matrix and

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constituent sentences. Item 10 is difficult for all three grades, but progressively less difficult for each successive grade level.

TABLE 10

Proportion of Subjects in Each Grade Choosing Each Option for Item

10. Sally's singing irritates me.
    a. Sally irritates me with her singing.
    b. I am irritated when Sally sings.
    *c. I am irritated by Sally's singing.

Option	Grade		
	4	8	11
a.	.52	.43	.38
b.	.16	.11	.03
*c.	.32	.46	.59

The relationship of It deletion and extraposition of a noun clause is tested in item 11. The distractor options change the subject of the sentence. The item is difficult (.19) for fourth graders, less difficult (.69) for eighth graders, and moderately easy (.80) for eleventh graders.

The relationship tested in item 12 is similar to that in item 7. The adverbial clause of time is abridged, and its position is shifted in the correct option. The main clause and the adverbial are reversed in the distractor options. The item is difficult at all three grade levels but becomes less difficult with each successive grade. Option c is more attractive than option b, probably because it has exactly the same lexical items as the pattern sentence.

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TABLE 11

Proportion of Subjects in Each Grade Choosing Each Option for Item

11. It was certain that Jim had won the prize.
    a. Jim was certain that he had won the prize.
    *b. That Jim had won the prize was certain.
    c. That Jim had won the prize he was certain

Option	Grade		
	4	8	11
a.	.75	.31	.20
*b.	.19	.69	.80
c.	.06	.00	.00

TABLE 12

Proportion of Subjects in Each Grade Choosing Each Option for Item

12. Daisy watched TV while she was doing her homework.
    *a. While doing her homework, Daisy watched TV.
    b. While watching TV, Daisy was doing her homework.
    c. While Daisy watched TV, she was doing her homework.

Option	Grade		
	4	8	11
*a.	.16	.35	.56
b.	.27	.17	.15
c.	.57	.48	.29

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Item 13 involves the variation of It deletion and extraposition of a negative noun clause. Distractor options make the matrix negative, resulting in a change of meaning (unlike the sentences in item 8). Again, there is an increase in the proportion of subjects choosing the correct option at each successive grade level.

TABLE 13

Proportion of Subjects in Each Grade Choosing Each Option for Item

13. That the book Tom lost was not his is certain.
*a. It is certain that the book Tom lost was not his.
b. It is not certain that the book Tom lost was his.
c. That the book Tom lost was his is not certain.

Option	Grade		
	4	8	11
*a.	.40	.72	.80
b.	.16	.18	.11
c.	.44	.09	.09

Recognition of the noun clause-infinitive variation is tested in item 14. Distractor options change the agentive noun in the constituent sentence. The item is easy at all three grade levels, but less so at grade four.

Passive sentences usually have as subject the noun that would function as direct object in the active form of the sentence, but they may sometimes have what would be the indirect object functioning as subject. Item 15

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involves this type of variation. Distractor options change the agentive noun. Level of difficulty of the item is related to grade level, i.e., the item is less difficult for each successive grade level.

TABLE 14

Proportion of Subjects in Each Grade Choosing Each Option for Item

14. The man decided tnat he would read the book to the boy.
    a. It was decided by the man that the boy would read the book to him.
    *b. The man decided to read the boy the book.
    c. The man decided the boy would read the book to him.

Option	Grade		
	4	8	11
a.	.14	.02	.05
*b.	.73	.97	.94
c.	.13	.02	.02

TABLE 15

Proportion of Subjects in Each Grade Choosing Each Option for Item

15. The bike was sold to the man by the boy.
    a. The boy was sold the bike by the man.
    *b. The man was sold the bike by the boy.
    c. The man sold the boy the bike.

Option	Grade		
	4	8	11
a.	.16	.09	.05
*b.	.60	.83	.92
c.	.25	.08	.03

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Item 16 requires recognition of the similarity between certain types of infinitive constructions and gerunds. Distractor options change the agentive noun in the constituent sentence. Again, item difficulty is associated with grade level, but there is little difference between grades eight and eleven.

TABLE 16

Proportion of Subjects in Each Grade Choosing Each Option for Item

16. It is easy to get along with Jack.
    a. Getting along is easy for Jack.
    b. It is easy for Jack to get along.
    *c. Getting along with Jack is easy.

Option	Grade		
	4	8	11
a.	.14	.00	.02
b.	.17	.05	.00
*c.	.68	.95	.98

Both the active-passive and the noun clause-infinitve phrase variations are tested in item 17. Distractor items have different nouns in the agentive role. The item is moderately difficult with 57 percent of the fourth graders choosing the correct option. Eighth and eleventh grade difficulty indices are essentially the same.

Item 18 is similar to item 11; it tests for recognition of the It deletion-extraposition variation. Distractor options have different matrix sentences. Although the item is easier than item 11, it has the same relationship between grade level and difficulty level.

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TABLE 17

Proportion of Subjects in Each Grade Choosing Each Option for Item

17. Lucy told Linus that he should take the test.
*a. Linus was told by Lucy to take the test.
b. Linus told Lucy to take the test.
c. Lucy was told that Linus should take the test.

Option	Grade		
	4	8	11
*a.	.57	.89	.88
b.	.13	.05	.02
c.	.30	.06	.11

TABLE 18

Proportion of Subjects in Each Grade Choosing Each Option for Item

18. It was good that Lucy had read the lesson.
a. Lucy had read that the lesson was good.
*b. That Lucy had read the lesson was good.
c. The lesson was good that Lucy had read.

Option	Grade		
	4	8	11
a.	.17	.02	.03
*b.	.30	.85	.91
c.	.52	.14	.06

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The pattern sentence in item 19 is passive and contains a relative clause; the correct option is active in form. Distractors use some of the same lexical items, but in different syntactic combinations. The item is moderately difficult at all three grade levels, with just under half of the fourth graders choosing the correct option.

TABLE 19

Proportion of Subjects in Each Grade Choosing Each Option for Item

19. The girl was made angry by the noises Charlie made.
    a. Charlie made noises to make the girl angry.
    *b. The noises Charlie made made the girl angry.
    c. It made the girl angry for Charlie to make noises.

Option	Grade		
	4	8	11
a.	.24	.06	.05
*b.	.48	.74	.70
c.	.29	.20	.26

Item 20 tests for recognition of the active-passive variation in a constituent sentence. Distractor options reverse the matrix and constituent sentences. The item is difficult for all three grades, but least difficult for grade eight. The performance of eleventh graders is almost identical with that of fourth graders.

The degree of syntactic complexity increases in item 21. The pattern sentence has a relative clause within a noun clause. The correct option represents It deletion and reduction of the relative clause to a prenominal

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TABLE 20

Proportion of Subjects in Each Grade Choosing Each Option for Item

20. Tom wanted the paper that was written by Mary.
    a. The paper Tom wanted was written by Mary
    *b. Tom wanted the paper Mary wrote.
    c. Mary wrote the paper that Tom wanted.

Option	Grade		
	4	8	11
a.	.41	.34	.59
*b.	.38	.60	.36
c.	.21	.06	.05

adjective. Option a reverses the constituent sentences, and option b has a different constituent sentence. The item is one of the most difficult on the test, and its level of difficulty distinguishes grade levels. It is interesting that the most attractive option (a) reverses the constituent sentences, a variation in syntax that makes little, if any, difference in semantic content.

Item 22 also involves a relative clause within a noun clause. The pattern sentence is passive and deletes the relative pronoun; the correct option is active and includes the relative pronoun. Distractor options change the order of the constituent sentences. The item is relatively difficult, and the level of difficulty corresponds to grade level.

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TABLE 21

Proportion of Subjects in Each Grade Choosing Each Option for Item

21. It was fortunate that the man who was kind saved the dog.
    a. It was fortunate that the man who saved the dog was kind.
    b. It was fortunate that the man was kind to save the dog.
    *c. That the kind man saved the dog was fortunate.

Option	Grade		
	4	8	11
a.	.40	.52	.56
b.	.43	.23	.12
*c.	.16	.25	.32

TABLE 22

Proportion of Subjects in Each Grade Choosing Each Option for Item

22. We were pleased that the boy we met in the park kept his promise.
    *a. That the boy whom we met in the park kept his promise pleased us.
    b. We were pleased that we met the boy in the park who kept his promise.
    c. It pleased us that we met the boy in the park who kept his promise.

Option	Grade		
	4	8	11
*a.	.29	.37	.58
b.	.49	.26	.26
c.	.21	.37	.17

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There are three constituent sentences in the pattern sentence of item 23, a relative clause within a relative clause within a noun clause. In the correct option, the relative pronoun is deleted in the former relative clause, and the latter clause is reduced to a participle phrase. Distractor options alter the order of the constituent sentences. Approximately half of the fourth graders chose the correct option. Seventy-seven percent of the eighth graders and 85 percent of the eleventh graders made the correct choice.

TABLE 23

Proportion of Subjects in Each Grade Choosing Each Option for Item

23. We are happy that the man who was driving the car in which we were riding was careful.
   a. We are happy that the careful man was driving the car in which we were riding.
   b. We are happy that the man who was careful was driving the car we were riding in.
   *c. We are happy that the man driving the car we were riding in was careful.

Option	Grade		
	4	8	11
a.	.17	.08	.06
b.	.32	.15	.09
*c.	.51	.77	.85

The pattern sentence of item 24 contains a relative clause within an adverbial clause; it also has a noun clause within the main clause. In

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the correct option, both the adverbial clause and the main clause are passive. In the distractors the adverbial clause follows the main clause and the constituent sentences are altered. The item is moderately difficult, and the level of difficulty corresponds to grade level.

TABLE 24

Proportion of Subjects in Each Grade Choosing Each Option for Item

24. When a dog that runs fast chases a rabbit, anyone can guess how the race will end.
   *a. When a rabbit is chased by a dog that runs fast, how the race will end can be guessed by anyone.
   b. Anyone can guess how the race will end when a rabbit that runs fast is chased by a dog.
   c. Anyone can guess how the race will end when a dog chases a rabbit that runs fast.

Option	Grade		
	4	8	11
*a.	.48	.74	.77
b.	.17	.06	.12
c.	.35	.20	.11

In item 25, the sentence adverbial fortunately alternates with It was fortunate. The active-passive variation is also included in the item. Option b has a different matrix sentence, and option c varies the agentive nouns. The correct option was chosen by approximately one-third of the fourth graders, one-half of the eighth graders, and two-thirds of the eleventh graders.

TABLE 25 **BEST COPY AVAILABLE**

Proportion of Subjects in Each Grade Choosing Each Option for Item

25. It was fortunate that Jane did not read the letter that Sally wrote.
   *a. Fortunately, the letter Sally wrote was not read by Jane.
   b. Jane was fortunate not to read the letter that Sally wrote.
   c. Fortunately, the letter Jane wrote was not read by Sally.

Option	Grade		
	4	8	11
*a.	.36	.51	.68
b.	.52	.34	.27
c.	.10	.15	.05

Sixteen of the 25 items of the "Agnate Sentences Test" showed the desired pattern of correspondence between grade level and item difficulty. These are items 2, 3, 7, 8, 10, 11, 12, 13, 15, 16, 18, 21, 22, 23, 24, and 25. Six of the remaining items were more difficult for fourth graders than for pupils of the higher grades; five of these items were slightly more difficult for eleventh graders than for eighth graders, and one was equally difficult for the two upper grades. Of the other three items, item 5 was most difficult for eighth graders, and items 4 and 20 were most difficult for eleventh graders.

Since fourth graders usually score lower on tests than pupils of higher grade levels, it is necessary to interpret these data with caution. The fact that the fourth grade scores on ITBS Reading were lower than those for eighth and eleventh graders must also be taken into account. When the nature of the test items is considered, however, it seems appropriate to conclude

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that the test results do show something about developmental differences in ability to decode written syntax. Exactly what they show about decoding ability and what the implications are for analyses of reading comprehension are questions that require further investigation.

Some of the syntactic structures included in this test probably occur more often in writing than in speech, e.g., nominative absolutes, appositives, abridged adverbials, and structures resulting from It deletion. Items containing these types of structures were among the more difficult ones on the test. Perhaps a study identifying syntactic structures primarily associated with written English and testing ability to decode such structures would give more information than is now available about the relationship between reading comprehension and developmental differences in the ability to decode syntactic structure.

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